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Pan-regional (cervico-thoraco-lumbo-sacral) spinal epidural abscess with multi-level discitis, vertebral body osteomyelitis and facet joint septic arthritis: complete resolution with non-operative management

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ABSTRACT

Background and importance: Pan-regional (i.e. cervico-thoraco-lumbo-sacral [CTLS]) spinal epidural abscess (SEA) is rare: only 7 cases have been reported to date.
Clinical presentation: A 68 year old male, without immunosuppression, presented with severe thoracic back pain and fulminant septicaemia. CT and MRI revealed a Pan-regional CTLS SEA associated with multi-level discitis, vertebral body osteomyelitis and facet joint septic arthritis. Blood cultures grew *Staphylococcus aureus* sensitive to flucloxacillin and rifampicin. Given the extent of suppuration, the lack of a clinical spinal 'level', as well as haemodynamic instability, neurosurgical management was conservative: with intravenous flucloxacillin and rifampicin. Over several weeks, his condition slowly improved: but at no point was any spinal 'level' apparent neurologically. He eventually made a complete clinical and radiological recovery without any operation which was maintained at one year review.
Conclusion: Even pan-regional CTLS SEA with multi-level discitis, vertebral body osteomyelitis and facet joint septic arthritis can be managed non-operatively. A complete clinical and radiological resolution can be achieved with antibiotics alone.

Introduction

Spinal epidural abscess (SEA) is an uncommon but potentially severe infection that can result in significant neurological morbidity and death [1–5]. SEA can involve any spinal level; and, in one third of cases, extend over more than 6 vertebral segments. Extensive multi-regional SEA, however, are rare: only n = 12 cervico-thoraco-lumbar (CTL), and n = 7 pan-regional cervico-thoraco-lumbo-sacral (CTLS) have been reported to date (Table 1).

In recent years, there has been a trend with even extensive multi-regional SEA towards operative intervention; with multi-level laminectomies and in some reports, blind irrigation through inserted catheters [2,4,5]. We present the case of a pan-regional CTLS SEA which was managed entirely non-operatively.

Case report

This 68-year-old male presented to his local hospital with severe, thoracic back pain and pyrexia. There was a past medical history of cerebral palsy (with long-standing right hemiparesis: leg affected more than arm), traumatic burst fractures and hypertension.

Neurological examination revealed evidence of only long-standing right hemiparesis (the patient confirmed that no new changes were present) with 4+/5 weakness, prominent spasticity, but normal sensation. Sphincteric function was also normal. Upon admission his condition rapidly deteriorated: with septicaemia, hypotension, confusion, paroxysmal atrial fibrillation and oxygen desaturation requiring Intensive Care. Full blood count revealed a leukocytosis (13.8×10^9/L) with neutrophilia (90%), whilst C-reactive protein was markedly elevated at 500 mg/L. Blood cultures subsequently revealed *Staphylococcus aureus* that was sensitive to flucloxacillin and rifampicin.

MRI revealed a pan-regional CTLS SEA associated with numerous focal collections extending from C4-T10 ventrally, spiralling down from T1 to L2 dorsally. These loculated collections distorted the thecal sac and caused mild canal stenosis: however, there were no signal changes within the spinal cord. In addition, there was discitis with

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Table 1
Reported cases of extensive multi-level spinal epidural abscess (SEA): n = 12 cervico-thoraco-lumbar (CTL), and n = 7 cervico-thoraco-lumbo-sacral (CTLS).

Reference, publication year	Age, sex	Associated conditions	Presentation	Abscess location	Outcome	Organism	Management
Stewart et al., 1981	59 y F	None	Weakness and sensory loss, UMN signs	CTL	Full recovery	MSSA	Antibiotics only
Mampalam et al., 1989	25 y F	IVDA, Pleural empyema	Pain, fever	CTL	Persistent discitis	MSSA	Antibiotics only
Lin et al., 1991	2 y M	None	Neck stiffness, back pain, fever, irritability	CTLS	Full recovery	MSSA	Antibiotics only
Wheeler et al., 1992	51 y M	Diabetes	Lower limb weakness, UMN signs	CTL	Full recovery	S. Constellatus	Antibiotics only
Duc et al., 2001	76 y F	Chemotherapy for rectal adenocarcinoma, foot ulcer	Pain, functional decline and frequent falls	CTL	Full recovery	MSSA	Antibiotics only
Panagiotopoulos et al., 2004	80 y M	IHD, UTI	Low back pain, fever, lower limb weakness	CTL	Full recovery	MSSA	Multi-level laminectomies, irrigation and antibiotics
Ansari et al., 2004	50 y F	Diabetes, splenectomy, epidural catheter insertion	Fever, confusion and meningism	CTL	Full recovery	MSSA	Multi-level laminectomies, blind irrigation and antibiotics
Urrutia et al., 2006[1]	36 y M	None	Pain, fever	CTLS	Full recovery	Peptostreptococcus	Multi-level laminectomies, blind irrigation and antibiotics
Riaz et al., 2007	56 y M	None	Quadriparesis	CTL	Full recovery	MSSA	Multi-level laminectomies, irrigation and antibiotics
Van Bergen et al., 2008	50 y M	Recent abdominal surgery	Back pain, fever	CTL	Full recovery	MSSA	Antibiotics only
Smith et al., 2009	27 y M	Chron's disease (on high-dose steroids)	Right sided numbness and hemiparesis, neck pain, fever	CTLS	Repeat operation 1 week later for recurrence	MSSA	Multi-level laminectomies, irrigation and antibiotics
Ghosh et al., 2009	7 mo F	None	Fever, irritability, decreased movement in right lower limb	CTL	Full recovery	MRSA	Antibiotics only
Elsamaloty et al., 2010	53 y M	Diabetes, toe ulcer	Quadriplegia, fever	CTL	Improved motor power in 4 limbs, no improvement in bladder/bowel function	MSSA	Multi-level laminectomies, irrigation and antibiotics
Connealy et al., 2010	29 y F	Pregnancy (no epidural used)	Horner syndrome, headache	CTL	Full recovery	MRSA	Multi-level laminectomies, irrigation and antibiotics
Tahir et al., 2010[2]	38 y F	IVDA, Hepatitis C	Lower limb weakness, UMN signs	CTLS	Full recovery	MSSA	Multi-level laminectomies, blind irrigation and antibiotics
Present report, 2010	68 y M	Hypertension, cerebral palsy	Pain, fever, confusion and meningism	CTLS	Full recovery	MSSA	Antibiotics only
O'Brien et al., 2011	71 y M	Diabetes	Low back pain, difficulty ambulating, urinary retention	CTLS	Full recovery	MSSA	Antibiotics only
Ronald et al., 2011	38 y F	IVDA, pregnancy, epidural catheter insertion	Pain, fever, lower limb weakness	CTL	Full recovery	MSSA	Multi-level laminectomies, irrigation and antibiotics
Burton et al., 2013	30 y F	Pregnancy (no epidural used)	Low back pain, urinary retention, lower limb weakness	CTLS	Recovery of lower limb power, required bladder catheterisation	MSSA	Multi-level laminectomies, irrigation and antibiotics

M, male; F, female; CTL, cervico-thoraco-lumbar; CTLS, cervico-thoraco-lumbo-sacral; SEA, spinal epidural abscess; MSSA, methicillin-sensitive *S. aureus*; MRSA, methicillin-resistant *S. aureus*.

vertebral body osetomyelitis at C3/C4, C5/C6, T4/T5, T8/T9; discitis at L3/L4 and L5/S1; left L5/S1 facet joint septic arthritis; and C7/T1 paraspinal pyomyositis (Fig. 1).

Given the widespread extent of suppuration, the lack of significant focal SEA correlating with a 'spinal level', as well as haemodynamic instability, neurosurgical management was initially conservative. Intravenous flucloxacillin and rifampicin were commenced on the advice of Infectious Diseases. The pyrexia gradually lysed, and systemic inflammatory parameters and clinical condition progressively improved. Trans-oesophageal echocardiography excluded infective endocarditis.

Our patient was eventually successfully weaned from the ventilator, and was thereafter transferred to the ward: he completed 6 weeks of intravenous antibiotics followed by 2 months of oral Clindamycin. On discharge, he could mobilize independently. At 1-year follow-up he maintained his pre-morbid status. Repeat MRI at one year confirmed complete SEA resolution (Fig. 2).

Discussion

SEA were once considered rare: however, the incidence has been rising primarily due to an ageing population and increased prevalence of intravenous drug abuse [1,2,4,5]. Most SEA occur in adults with contemporary reviews quoting mean age between 51.4–65 years, with male-to-female sex ratio of 1:0.60 [1,2,4,5]. Hawkins et al. reported a series of 9 paediatric patients, whose mean age was 9 years with male-to-female ratio of 1:0.7 [6].

The diagnosis may be obtained on blood cultures in approximately 60% of SEA [2]: however the yield is greater when direct pus samples are obtained (e.g. interventional radiology) [1,4,5]. Infection can result from haematogenous spread from a distant focus (approx. 50%) [5], direct spread from contiguous vertebral osteomyelitis or disc space infection [5], or by direct inoculation (e.g. trauma, operation, epidural steroid injection, lumbar puncture or epidural catheterization) [6]. Less commonly, there is no identifiable source [7]. Risk factors for SEA include diabetes mellitus, intravenous drug abuse, renal failure and haemodialysis and immunosuppression, spinal implants, epidural catheter insertion and pregnancy [1,2,4,5]. Of significance, our patient had no obvious risk factors.

The most common causative pathogen (approx. 60–75%) associated with SEA is *S. aureus* (with the majority being methicillin-sensitive *S. aureus* and the remainder methicillin-resistant). Less